

36. An isolated or recombinantly expressed antifreeze protein, said protein comprising the following:

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- (i) a calculated molecular weight of between 7 and 13 kDa;
 - (ii) a thermal hysteresis activity of greater than about 1.5°C at a concentration of about 1 mg/mL;
 - (iii) the N-terminal amino acid motif set forth in SEQ ID NO:3;
 - (iv) specific binding to an antibody raised against an antifreeze protein selected from the group consisting of YL-1 (SEQ ID NO:11), YL-2 (SEQ ID NO:13), YL-3 (SEQ ID NO:17), and YL-4 (SEQ ID NO:15); and
 - (v) at least about 70% amino acid sequence identity to an antifreeze protein selected from the group consisting of YL-1 (SEQ ID NO:11), YL-2 (SEQ ID NO:13), YL-3 (SEQ ID NO:17), and YL-4 (SEQ ID NO:15).

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37. The isolated or recombinant antifreeze protein of claim 36, wherein the antifreeze protein comprises at least one repeat of the 12 contiguous amino acid motif set forth in SEQ ID NO:1.

38. The isolated or recombinant antifreeze protein of claim 37, wherein the number of repeats of the motif is from 5 to 12.

39. The isolated or recombinant antifreeze protein of claim 36, wherein the calculated molecular weight of the antifreeze protein is between 8 and 12 kDa.

40. The isolated or recombinant antifreeze protein of claim 36, wherein the antifreeze protein includes the subsequence of amino acids set forth in SEQ ID NO:4.

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41. The isolated or recombinant antifreeze protein of claim 36, wherein the thermal hysteresis activity is greater than about 2°C at a concentration of about 1 mg/mL.

42. The isolated or recombinant antifreeze protein of claim 36, wherein the antifreeze protein is selected from the group consisting of YL-1 (SEQ ID NO:11), YL-2 (SEQ ID NO:13), YL-3 (SEQ ID NO:17), and YL-4 (SEQ ID NO:15).

43. The isolated or recombinant antifreeze protein of claim 36, wherein the antifreeze protein

is expressed by a baculovirus vector.

44. The isolated or recombinant antifreeze protein of claim 36, wherein the antifreeze protein is synthesized by a bacterial cell, a fungus cell, a plant cell, or an animal cell.

45. The isolated or recombinant antifreeze protein of claim 36, wherein the antifreeze protein is synthesized by a yeast cell.

46. The isolated or recombinant antifreeze protein of claim 36, wherein the antifreeze protein is synthesized by an animal cell.

a 47. The isolated or recombinant antifreeze protein of claim 36, wherein the nucleic acid encoding the antifreeze protein is synthesized by an insect cell.

48. The isolated or recombinant antifreeze protein of claim 36, wherein the antifreeze protein is derived from *Tenebrio* sp.

49. The isolated or recombinant antifreeze protein of claim 44, wherein the antifreeze protein is expressed externally from the cell.

50. An isolated or recombinantly expressed antifreeze protein, wherein said antifreeze protein is encoded by a nucleic acid which specifically hybridizes to SEQ ID NO:2 under stringent wash conditions of 0.2x SSC at 65°C for 15 minutes, and wherein said antifreeze protein has a thermal hysteresis activity greater than about 1.5°C at a concentration of about 1 mg/mL.

51. The antifreeze protein of claim 50, wherein the nucleic acid specifically hybridizes under highly stringent wash conditions of 0.15 M NaCl at 72°C for 15 minutes.

52. The isolated or recombinant antifreeze protein of claim 50, wherein the antifreeze protein comprises at least one repeat of the 12 contiguous amino acid motif set forth in SEQ ID NO:1.

53. The isolated or recombinant antifreeze protein of claim 52, wherein the number of repeats of the motif is from 5 to 12.

54. The isolated or recombinant antifreeze protein of claim 50, wherein the antifreeze protein has a calculated molecular weight of between 7 and 13 kDa.

55. The isolated or recombinant antifreeze protein of claim 50, wherein the antifreeze protein includes the subsequence of amino acids set forth in SEQ ID NO:4.

56. The isolated or recombinant antifreeze protein of claim 50, wherein the thermal hysteresis activity is greater than about 2°C at a concentration of about 1 mg/mL.

57. The isolated or recombinant antifreeze protein of claim 50, wherein the antifreeze protein is expressed by a baculovirus vector.

58. The isolated or recombinant antifreeze protein of claim 50, wherein the antifreeze protein is synthesized by a bacterial cell, a fungus cell, a plant cell, or an animal cell.

59. The isolated or recombinant antifreeze protein of claim 50, wherein the antifreeze protein is synthesized by a yeast cell.

60. The isolated or recombinant antifreeze protein of claim 50, wherein the antifreeze protein is synthesized by an animal cell.

61. The isolated or recombinant antifreeze protein of claim 50, wherein the antifreeze protein is synthesized by an insect cell.

62. The isolated or recombinant antifreeze protein of claim 50, wherein the antifreeze protein is derived from *Tenebrio* sp.

63. The isolated or recombinant antifreeze protein of claim 58, wherein the antifreeze protein

is expressed externally from the cell.

64. An isolated or recombinantly expressed antifreeze protein, wherein said antifreeze protein is encoded by a nucleic acid which specifically hybridizes under stringent wash conditions of 0.2x SSC at 65°C for 15 minutes to the subsequence of SEQ ID NO:12 from nucleotides 105 to 359, and wherein said antifreeze protein lacks a signal sequence.

65. The antifreeze protein of claim 64, wherein the nucleic acid specifically hybridizes under highly stringent wash conditions of 0.15 M NaCl at 72°C for 15 minutes.

66. The isolated or recombinant antifreeze protein of claim 64, wherein the antifreeze protein comprises at least one repeat of the 12 contiguous amino acid motif set forth in SEQ ID NO:1.

67. The isolated or recombinant antifreeze protein of claim 64, wherein the number of repeats of the motif is from 5 to 12.

68. The isolated or recombinant antifreeze protein of claim 64, wherein the antifreeze protein has a calculated molecular weight of between 7 and 13 kDa.

69. The isolated or recombinant antifreeze protein of claim 64, wherein the antifreeze protein includes the subsequence of amino acids set forth in SEQ ID NO:4.

70. The isolated or recombinant antifreeze protein of claim 64, wherein the antifreeze protein has a thermal hysteresis activity of greater than about 1.5°C at a concentration of about 1 mg/mL.

71. The isolated or recombinant antifreeze protein of claim 64, wherein the antifreeze protein is expressed by a baculovirus vector.

72. The isolated or recombinant antifreeze protein of claim 64, wherein the antifreeze protein is synthesized by a bacterial cell, a fungus cell, a plant cell, or an animal cell.

73. The isolated or recombinant antifreeze protein of claim 64, wherein the antifreeze protein is synthesized by a yeast cell.

74. The isolated or recombinant antifreeze protein of claim 64, wherein the antifreeze protein is synthesized by an animal cell.

75. The isolated or recombinant antifreeze protein of claim 64, wherein the antifreeze protein is synthesized by an insect cell.

76. The isolated or recombinant antifreeze protein of claim 64, wherein the antifreeze protein is derived from *Tenebrio* sp.

77. The isolated or recombinant antifreeze protein of claim 72, wherein the antifreeze protein is expressed externally from the cell.

78. A liquid comprising a recombinant antifreeze protein, said antifreeze protein comprising the following:

- (i) a calculated molecular weight of between 7 and 13 kDa;
- (ii) a thermal hysteresis activity of greater than about 1.5°C at a concentration of about 1 mg/mL;
- (iii) the N-terminal amino acid motif set forth in SEQ ID NO:3;
- (iv) specific binding to an antibody raised against an antifreeze protein selected from the group consisting of YL-1 (SEQ ID NO:11), YL-2 (SEQ ID NO:13), YL-3 (SEQ ID NO:17), and YL-4 (SEQ ID NO:15); and
- (v) at least about 70% amino acid sequence identity to an antifreeze protein selected from the group consisting of YL-1 (SEQ ID NO:11), YL-2 (SEQ ID NO:13), YL-3 (SEQ ID NO:17), and YL-4 (SEQ ID NO:15).

79. The liquid of claim 78, wherein the antifreeze protein comprises at least one repeat of the 12 contiguous amino acid motif set forth in SEQ ID NO:1.

80. The liquid of claim 78, wherein the concentration of antifreeze protein is between about